ABSTRACT OF THE DISCLOSURE

A method is provided for forming a self aligned contact by etching an opening through a low doped or undoped dielectric layer such as phosphosilicate glass. The dielectric layer may be formed on a semiconductor layer which may include regions of monocrystalline silicon and undoped silicon dioxide. A first portion of a dielectric layer may be etched with a first etch chemistry, and a second portion of the dielectric layer may be etched with a second etch chemistry. The first etch chemistry may be substantially different than the second etch chemistry. In this manner, the first etch chemistry may have a substantially different etch selectivity than the second etch chemistry. For example, in an embodiment, the first etch chemistry may be selective to silicon nitride, and the second etch chemistry may be selective to undoped silicon oxide. Therefore, by using multiple etch chemistries to etch a single dielectric layer, a self aligned contact having optimized properties such as sidewall angle, aspect ratio, and critical dimension may be formed while an etch stop liner layer such as a silicon nitride layer may be eliminated.